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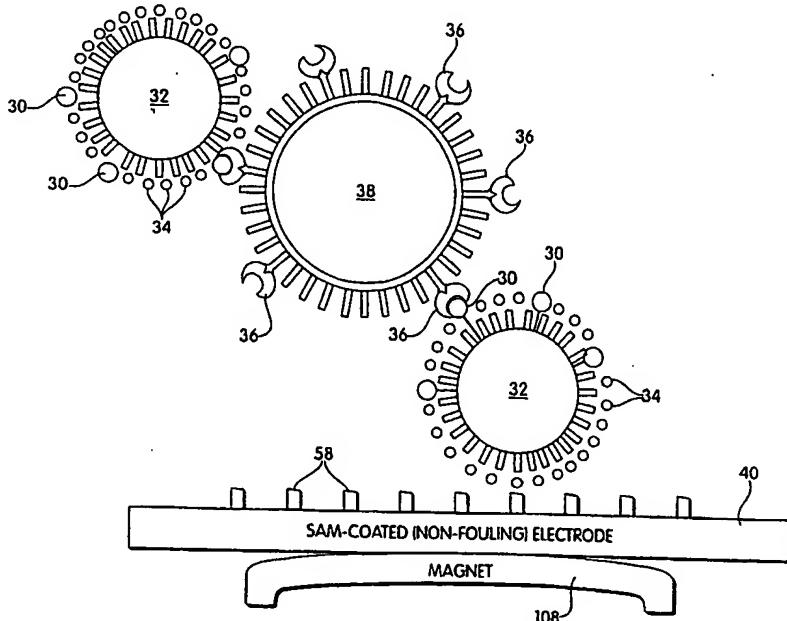
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INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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|---|----------------------------|---|--|-------------------------|
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| 60/132,289  | 3 May 1999 (03.05.99)      | US  |  |                         |
| 60/133,148  | 7 May 1999 (07.05.99)      | US  |  |                         |
| 60/133,772  | 12 May 1999 (12.05.99)     | US  |  |                         |
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| (72) Inventors; and                                     |                            | Published   |  |                         |
| (75) Inventors/Applicants (for US only):                |                            | BAMDAD, Cynthia, Carol [US/US]; 142 Church Street, Newton, MA 02458 (US). BAMDAD, R., Shoshana [US/US]; 142 Church Street, Newton, MA 02458 (US). |  |                         |
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(54) Title: INTERACTION OF COLLOID-IMMOBILIZED SPECIES WITH SPECIES ON NON-COLLOIDAL STRUCTURES



(57) Abstract

The invention provides novel techniques for derivatizing colloids with self-assembled monolayers. This provides the capability of a wide variety of assays including chemical or biochemical agent/agent interaction studies. Bio-derivatized colloids, with or without signaling entities, are used to probe interactions with species on non-colloidal structures. The invention provides techniques for immobilizing colloidal particles on a wide variety of non-colloidal structures. Included is the ability to decorate a variety of non-colloidal structures including beads, with colloids as a detectable assay. This allows, in many cases, assays detectable via the unaided human eye, as well as assays detectable via automated determination of a change of interaction of electromagnetic radiation with the colloids, e.g., absorption, light-scattering, and the

# INTERNATIONAL SEARCH REPORT

International Application No  
PCT/US 00/01504

| A. CLASSIFICATION OF SUBJECT MATTER<br>IPC 7 G01N33/543  |   |  |
|--|---|--|
| According to International Patent Classification (IPC) or to both national classification and IPC  |   |  |
| B. FIELDS SEARCHED   |   |  |
| Minimum documentation searched (classification system followed by classification symbols)<br>IPC 7 G01N  |   |  |
| Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched  |   |  |
| Electronic data base consulted during the international search (name of data base and, where practical, search terms used)<br>EPO-Internal, WPI Data, BIOSIS, CHEM ABS Data  |   |  |
| C. DOCUMENTS CONSIDERED TO BE RELEVANT   |   |  |
| Category *   | Citation of document, with indication, where appropriate, of the relevant passages  | Relevant to claim No.  |
| A  | US 4 945 045 A (FORREST GORDON C ET AL)<br>31 July 1990 (1990-07-31)<br>column 12, line 50 -column 13, line 20<br>column 10, line 65 - line 58<br>---   | 1-163  |
| A  | G A ROBINSON, H A O HILL, R D PHILO, J M<br>GEAR, S J RATTLE, G C FORREST:<br>"Bioelectrochemical Enzyme Immunoassay of<br>Human Choriogonadotropin with Magnetic<br>Electrodes"<br>CLINICAL CHEMISTRY,<br>vol. 31, no. 9, 1985, pages 1449-1452,<br>XP002142426<br>the whole document<br>--- | 1-163  |
|  | -/-   |  |
| <input checked="" type="checkbox"/> Further documents are listed in the continuation of box C.   |   | <input checked="" type="checkbox"/> Patent family members are listed in annex. |
| <p>* Special categories of cited documents :</p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> <p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone</p> <p>"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.</p> <p>"&amp;" document member of the same patent family</p> |   |  |
| Date of the actual completion of the international search  | Date of mailing of the international search report  |  |
| 13 July 2000   | 28/07/2000  |  |
| Name and mailing address of the ISA<br>European Patent Office, P.B. 5818 Patentlaan 2<br>NL - 2280 HV Rijswijk<br>Tel. (+31-70) 340-2040, Tx. 31 651 epo nl.<br>Fax: (+31-70) 340-3016   | Authorized officer<br><br>Hart-Davis, J   |  |

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## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

| Category | Citation of document, with indication, where appropriate, of the relevant passages   | Relevant to claim No. |
|----------|--|-----------------------|
| A        | EP 0 579 343 A (EPPENDORF NETHELER HINZ GMBH G) 19 January 1994 (1994-01-19)<br>column 3, line 38 -column 4, line 1<br>column 4, line 23 - line 31; figures 1,2<br>---   | 1-163                 |
| A        | US 5 620 850 A (BAMDAD CYNTHIA C ET AL)<br>15 April 1997 (1997-04-15)<br>cited in the application<br>claims 1-28; example 1<br>---   | 1-163                 |
| A        | DE 38 06 558 A (HITACHI LTD)<br>15 September 1988 (1988-09-15)<br>claims 1,3,6,12,13<br>---  | 1,36,63,<br>66        |
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FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

Continuation of Box I.2

In view of the large number and also the wording of the claims presently on file, which render it difficult, if not impossible, to determine the matter for which protection is sought, the present application fails to comply with the clarity and conciseness requirements of Article 6 PCT (see also Rule 6.1(a) PCT) to such an extent that a meaningful search is impossible. Support within the meaning of Article 6 PCT and/or disclosure within the meaning of Article 5 PCT is to be found only a very small proportion of the methods and articles which could fall under the claims as filed. It was not possible to derive from the application which specific technical problem is to be solved (page 2, lines 13-22 discuss a number of distinct problems), nor which is the specific solution to the technical problem which constitutes the invention (see in particular pages 3-8). The present application thus also fails to comply with the requirements of Rule 5.1 (a) (iii) PCT. Consequently, the search has been carried out for those parts of the application which do appear to be clear (and concise), namely the electrochemical binding assays of Examples 1,3 and 7 (and the materials used therein) in which a colloidal particle bearing a first protein and also bearing a signal entity (an electroactive ferrocene moiety) is combined with a non-colloidal structure (magnetic beads in Ex.1 and Ex.7, cells growing on electrode surfaces in Ex.3), where the non-colloidal structure bears a second protein binding to the first protein, optionally in the presence of a candidate agent for drug screening.

The applicant's attention is drawn to the fact that claims, or parts of claims, relating to inventions in respect of which no international search report has been established need not be the subject of an international preliminary examination (Rule 66.1(e) PCT). The applicant is advised that the EPO policy when acting as an International Preliminary Examining Authority is normally not to carry out a preliminary examination on matter which has not been searched. This is the case irrespective of whether or not the claims are amended following receipt of the search report or during any Chapter II procedure.

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No  
PCT/US 00/01504

| Patent document cited in search report | Publication date | Patent family member(s) |          |   | Publication date |
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